WHAT IS CLAIMED IS:

1. A device for interferometric wavefront measurement of an optical system, having

- a detector arrangement for positioning in the beam path down-stream of the optical system for detecting a generated interference pattern of a wavefront within a detection area, and

- a dynamic range correction element, for positioning in the beam path upstream of the detector arrangement, designed for keeping a variation in a spatially dependent characteristic of a phase of the wavefront forming the interference pattern below a prescribed limit value throughout the detection area.

2. The device according to Claim 1, of a type operating with lateral shearing interferometry, wherein the dynamic range correction element is designed for keeping the second partial spatial derivatives of the phase of the wavefront forming the interference pattern below a prescribed threshold value throughout the detection area.

3. The device according to Claim 1, wherein the dynamic range correction element is selected from the group consisting of a computer-generated hologram element, another diffractive optical element and an aspheric lens element.

4. The device according to Claim 3, further comprising a common transparent carrier provided for the dynamic range correction element and a diffraction grating structure, wherein the diffraction grating structure is arranged on a front side of the common transparent carrier and on the dynamic range correction element is arranged on a rear side of the common transparent carrier.

5. A device for wavefront measurement of an optical system by means of lateral shearing interferometry, comprising:

- at least one mask structure element positioned in the beam path upstream of the optical system,

- at least one diffraction structure element with at least one periodic diffraction structure positioned in the beam path down-stream of the optical system, and

- a detector arrangement positioned in the beam path downstream of the diffraction structure element for detecting a generated interference pattern of a wavefront within a detection area,

- wherein a set of several diffraction structures of different period lengths is provided on the at least one diffraction structure element, and a set of corresponding mask structures is provided on the at least one mask structure element, to measure the optical system with the aid of diffraction structures of different period lengths for at least two different sub-areas of the detection area.

6. The device according to Claim 5, wherein at least a first diffraction structure with a first period length is provided for measuring the optical system in a first detection sub-area, and a second diffraction structure with a second period length greater than the first period length is provided for measuring the optical system in a second detection sub-area with a wavefront phase modulation which is higher in the second detection sub-area than in the first detection sub-area.

7. The device according to Claim 6, further comprising an evaluation unit for evaluating the detected interference pattern including determination and correction of a distortion error.

8. A device for wavefront measurement of an optical system by means of point diffraction interferometry, comprising:

- a pinhole mask positioned in the beam path upstream of the optical system,

- a beam splitting element for generating a measuring beam and a reference beam,

- at least one detector-side shadow mask structure positioned in the beam path downstream of the optical system and having a reference pinhole for the reference beam and a signal passage opening, spaced apart therefrom, for the measuring beam, and

- a detector arrangement positioned in the beam path down-stream of the detector-side shadow mask structure for detecting a generated interference pattern within a detection area,

- wherein a set of several pairs of reference pinhole and signal passage opening with different spacings of reference pinhole and signal passage opening is provided in order to measure the optical system with the aid of shadow mask structures with different spacings of reference pinhole and signal passage opening for at least two sub-areas of the detection area.

9. The device according to Claim 8, further comprising an evaluation unit for evaluating the detected interference pattern including determination and correction of a distortion error.

10. A method for optical measurement of an optical system, comprising:

- detecting measuring radiation coming from the optical system, and

- determining a distortion error by determining a distortion function from a comparison of detected actual positions of interference fringes with computational desired positions when changing one or more external parameters, the change in the at least one external parameter comprising at least one of a change in the position of a detector arrangement or of a mask structure of a measuring device parallel to a main optical axis, a change in the wavelength of the measuring radiation, and a change in aberrations through adjustment of xy-manipulators or z-manipulators of the measured optical system.

11. The method according to Claim 10, wherein the optical measurement is carried out by a lateral shearing interferometry technique, a point diffraction interferometry technique or another interferometric wave-front measurement technique.

12. The method according to Claim 11, wherein the interferometric wave-length measurement comprises:

- placing a detector arrangement in the beam path downstream of the optical system in order to detect a generated interference pattern of a wavefront within a detection area, and

- placing a dynamic range correction element in the beam path up-stream of the detector arrangement, which element is designed for keeping the variation in the spatially dependent characteristic of a phase of the wavefront forming the interference pattern below a prescribed limit value throughout the detection area.

13. The method according to Claim 11, wherein the interferometric wavefront measurement comprises a measurement by means of lateral shearing interferometry comprising:

- positioning at least one mask structure element in the beam path upstream of the optical system,

- positioning at least one diffraction structure element with at least one periodic diffraction structure in the beam path downstream of the optical system, and

- positioning a detector arrangement in the beam path downstream of the diffraction structure element in order to detect a generated interference pattern of a wavefront within a detection area,

- wherein a set of several diffraction structures of different period lengths are used on the at least one diffraction structure element, and a set of corresponding mask structures are provided on the at least one mask structure element, in order to measure the optical system with the aid of diffraction structures of different period lengths for at least two different sub-areas of the detection area.

14. The method according to Claim 11, wherein the interferometric wavefront measurement comprises a measurement by means of point diffraction interferometry comprising:

- positioning a pinhole mask in the beam path upstream of the optical system,

- positioning at least one detector-side shadow mask with at least one pair of a reference pinhole and a signal passage opening spaced apart therefrom in the beam path downstream of the optical system, and

- positioning a detector arrangement in the beam path downstream of the detector-side shadow mask in order to detect a generated interference pattern of a wavefront within a detection area,

- wherein a set of several pairs of reference pinhole and signal passage opening with different spacings of reference pinhole and signal passage opening are used in order to measure the optical system with the aid of pairs of holes with a

different spacing of reference pinhole and signal passage opening for at least two different sub-areas of the detection area.

15. A method for optical measurement of an optical system, comprising:

- detecting measuring radiation coming from the optical system, and

- determining and computationally correcting a distortion error of the detected measuring radiation,

- wherein the distortion error is determined by calculating a distortion transformation by means of a calculation of the optical beam path or by a distortion measurement by means of introducing reference patterns into a pupil, or a plane near the pupil, of a measuring optical imaging system, or into a plane conjugate therewith, or by a distortion measurement by means of moiré structures or by determining a distortion function from a comparison of detected actual positions of interference fringes with computational desired positions when changing one or more external parameters, the change in the at least one external parameter comprising at least one of a change in the position of a detector arrangement or of a mask structure of a measuring device parallel to a main optical axis, a change in the wavelength of the measuring radiation, or a change of aberrations by adjusting xy-manipulators or z-manipulators of the measured optical system, and

- wherein a distortion transformation describing the distortion error is determined by at least one of measurement and computation, and the distortion error is corrected computationally by applying the inverse distortion transformation.

16. The method according to Claim 15, wherein the optical measurement is carried out by a lateral shearing interferometry technique, a point diffraction interferometry technique or another interferometric wave-front measurement technique.

17. The method according to Claim 16, wherein the interferometric wavefront measurement comprises a measurement by means of lateral shearing interferometry comprising:

- positioning at least one mask structure element in the beam path upstream of the optical system,

- positioning at least one diffraction structure element with at least one periodic diffraction structure in the beam path downstream of the optical system, and

- positioning a detector arrangement in the beam path downstream of the diffraction structure element in order to detect a generated interference pattern of a wavefront within a detection area,

- wherein a set of several diffraction structures of different period lengths are used on the at least one diffraction structure element, and a set of corresponding mask structures are provided on the at least one mask structure element, in order to measure the optical system with the aid of diffraction structures of different period lengths for at least two different sub-areas of the detection area.

18. The method according to Claim 16, wherein the interferometric wavefront measurement comprises a measurement by means of point diffraction interferometry comprising:

- positioning a pinhole mask in the beam path upstream of the optical system,

- positioning at least one detector-side shadow mask with at least one pair of a reference pinhole and a signal passage opening spaced apart therefrom in the beam path downstream of the optical system, and

- positioning a detector arrangement in the beam path downstream of the detector-side shadow mask in order to detect a generated interference pattern of a wavefront within a detection area,

- wherein a set of several pairs of reference pinhole and signal passage opening with different spacings of reference pinhole and signal passage opening are used in order to measure the optical system with the aid of pairs of holes with a different spacing of reference pinhole and signal passage opening for at least two different sub-areas of the detection area.

19. The method according to Claim 16, wherein the interferometric wavelength measurement comprises:

- placing a detector arrangement in the beam path downstream of the optical system in order to detect a generated interference pattern of a wavefront within a detection area, and

- placing a dynamic range correction element in the beam path upstream of the detector arrangement, which element is designed for keeping the variation in the spatially dependent characteristic of a phase of the wavefront forming the interference pattern below a prescribed limit value throughout the detection area.

20. The method according to Claim 19, wherein the interferometric wavefront measurement comprises a measurement by means of lateral shearing interferometry comprising:

- positioning at least one mask structure element in the beam path upstream of the optical system,

- positioning at least one diffraction structure element with at least one periodic diffraction structure in the beam path downstream of the optical system, and

- positioning a detector arrangement in the beam path downstream of the diffraction structure element in order to detect a generated interference pattern of a wavefront within a detection area,

- wherein a set of several diffraction structures of different period lengths are used on the at least one diffraction structure element, and a set of corresponding mask structures are provided on the at least one mask structure element, in order to measure the optical system with the aid of diffraction structures of different period lengths for at least two different sub-areas of the detection area.

21. The method according to Claim 19, wherein the interferometric wavefront measurement comprises a measurement by means of point diffraction interferometry comprising:

- positioning a pinhole mask in the beam path upstream of the optical system,

- positioning at least one detector-side shadow mask with at least one pair of a reference pinhole and a signal passage opening spaced apart therefrom in the beam path downstream of the optical system, and

- positioning a detector arrangement in the beam path downstream of the detector-side shadow mask in order to detect a generated interference pattern of a wavefront within a detection area,

- wherein a set of several pairs of reference pinhole and signal passage opening with different spacings of reference pinhole and signal passage opening are used in order to measure the optical system with the aid of pairs of holes with a different spacing of reference pinhole and signal passage opening for at least two different sub-areas of the detection area.